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Book Reviews

Organic ion radicals : Chemistry and applications
by **Z V Todres**

Marcel Dekker : New York-Basel (2003)
xi + 444 pages, illustrated : price : US $ 185.00 (hard cover);
ISBN : 0-8247-0810-5

This is a book which in my opinion, should find a place in the libraries of all universities and research institutes, where people are engaged in active research in synthetic or mechanistic organic chemistry.

While books and monographs dealing with ionic or radical intermediates abound, no comprehensive treatise on organic ion radical intermediates came to my notice, before Professor Todres' book came into the market. As such, this was a very welcome initiative. The task taken by the author was Herculean which the author has carried out with commendable skill, when he could bring in a reasonable amount of space, all the different aspects of ion radical chemistry. This uphill task was made possible because of his active involvement in this field.

The first three chapters of the book deal with the basic principles of ion radical chemistry. In the fourth and in my opinion the most illuminating chapter of the book, the author has exhaustively enumerated the different factors which direct the reaction to an ion radical mechanistic pathway and also the ways to discern such a mechanism. A particularly interesting example is the use of Hammett type correlation to find when a reaction passes from classical to ion radical mechanism. Contents of chapter 5 dealing with optimisation of ion radical reactions, are useful for workers active in this field. The author's treatment of Bouveault-Blanc reduction and Birch reduction in chapter 6 is commendable and has thrown new light on these reactions with which we are familiar since our undergraduate days! Information provided in chapter 7, on the practical aspects of ion radicals *e.g.* their applications in molecular switches, optoelectronic devices and organic lubricants among others, are useful. The last chapter while giving a general overview, has also dealt with some special topics of which, the discussion on how the ion radical stage affects the stereochemical course of a reaction is particularly fascinating.

The book is characterised by the lucidity of presentation, which has made it immensely readable. I congratulate the author for taking up a difficult task and executing it with considerable skill.

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Fifth Workshop on Electronics for LHC Experiments
(Proceedings, Snowmass, Colorado, USA, 20–24 September, 1999)

CERN 99-07 : Geneva (1999)
vi + 618 pages, illustrated; (soft cover)
ISBN : 92-9083-147-2

The book under review is proceedings of the Fifth Workshop on Electronics for LHC Experiments held at Snowmass, Colorado, USA, 20–24 September, 1999 organized by University of Madison Wisconsin, USA on behalf of CERN, LHC Electronics Board.

The organization of the proceedings is under various headings like plenary talks, Electronics for trackers, Optoelectronics and data transfer systems, Radiation and magnetic field tolerant electronics systems, Electronics for calorimeters, Trigger electronics, Data acquisition and Detector control and real time systems, Ground shielding and cooling Electronics for muon detectors, posters and papers and makes it convenient for reader to quickly arrive at region of his choice.

Plenary talks cover overall needs and electrical requirements of Electronics to be installed for operation of machine and carrying out experiments at LHC, bring in focus and discuss issues like radiation qualification, speed, on chip signal integrity noise and electromagnetic compliance of available VLSI technologies; merits and demerits of ASIC *vis-à-vis* Field programmable Gate Arrays and use of off the shelf available electronics developed for use in space experiments.

Developing and commissioning of BABAR electronics which is similar to experiments planned at LHC have been discussed and some guide lines have been suggested for avoiding pitfalls.

General testing problems at the IC, MCM board and system level are analyzed and need for testing of Electronics is highlighted considering an order of magnitude increase in size and complexity compared to previous generation of high energy experiments.

Electronics for trackers section covers design philosophy, production, implementation and installation of readout electronics for pixel and silicon strip tracking detectors for ATLAS and ALICE experiments. Special techniques like use of micro cables (Kapton/Aluminium 12/14 micron thick) and specialized tab bonded SSD modules for ALICE trackers are highlighted. Under optoelectronics and data transfer systems, Analog read-out and digital control optical links for CMS trackers, ATLAS SCT and pixel detectors have been discussed Radiations and magnetic field tolerant electronics systems describe various techniques used and results achieved for making various components like silicon pixel and strip detectors, Avalanche photodiodes and low drop-out voltage regulators. Electronics for calorimeters describes intricacies of various read-out schemes adopted for read-out of signals from various types (liquid Argon, electromagnetic and hadronic) calorimeters proposed to be used in LHC. Characterization of the coherent noise, Electromagnetic compatibility and Electromagnetic interferences are discussed.

Performance of front end electronics for hadronic calorimeter *etc* are studied in relation to radiation damage, electrostatic discharge resistance reliability and manufacturing.

Trigger electronics section presents 13 papers describing various levels of triggers, trigger generation philosophies, trigger modes and their implementation using FPGA or specific timing, trigger and control interfaces modules and strategy for timing adjustments in end cap trigger systems for ATLAS, ALICE and CMS end cap muon systems.

Data acquisition, detector control and real time system present 9 articles discussing various DAQ systems, read-out driver for ATLAS liquid Argon calorimeter, ALICE TOF read-out system, an eight channel TDC chip for high rate experiments.

Grounding shielding and cooling section has 8 papers discussing and evaluating issues like the acceptance of SMPS for CMS EMC, liquid Argon calorimeter, liquid cooling systems for LHC detectors, Fluorocarbon evaporative cooling developments for ATLAS pixel and semiconductor tracking detectors, custom built HV and LV supplies for LHC experiments.

Electronics for muon detectors starts with Gassiplex-0 7 micron n-well, 16 channel ASIC front end analog signal processor for HMPID and Dimuon spectrometer in ALICE Then there are papers on an octal CMOS ASD (Amplifier shaper-discriminator) for ATLAS muon detector and ASD for thin gap chambers in LHC.

Posters : This section contains 22 papers covering almost all aspects of the conference plus some novel ideas and schemes like use of diffused laser irradiation to improve dose rate simulation adequacy, neural network triggers for global event decision at LHC, low cost LAN node for A/D measurements in ATLAS, development of printed circuit units of multiwire chamber.

Although meant for very specific audience it may interest even a casual reader interested in experimental high energy physics.

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